REGISTER

OF

THE LEHIGH UNIVERSITY,

FOR THE YEAR 1878-79.

TUITION FREE.

SOUTH BETHLEHEM, PA.
1879.

REGISTER

OF THE

TRUSTEES, OFFICERS AND STUDENTS

OF

THE LEHIGH UNIVERSITY,

SOUTH BETHLEHEM, PENN'A,

FOR THE YEAR 1878-79,

WITH THE PLAN OF ORGANIZATION AND COURSE OF INSTRUCTION.

TUITION FREE.

FOUNDED BY ASA PACKER.

BETHLEHEM, PA.:
D. J. GODSHALK & CO., PRINTERS.
1879.

CALENDAR.

1878-79.

1878.		
Sept. 4.	First Term begins - - - -	Wednesday.
Nov. 28.	Thanksgiving Day - - - - -	Thursday.
Dec. 21.	First Term ends - - - - -	Saturday.
1879.		
Jan. 11.	Second Term begins - - - -	Saturday.
Feb. 22.	Washington's Birthday - - -	Saturday.
Feb. 26.	Ash Wednesday - - - - -	
April 10.	Easter Holidays begin - - - -	Thursday.
April 14.	Easter Holidays end - - - -	Monday.
June 6.	Annual Examination begins - - -	Friday.
June 13-14.	Examinations for Admission -	Friday and Saturday.
June 15.	University Sermon - - - - -	Sunday.
June 18.	Reading of Theses - - - -	Wednesday.
June 19.	University Day - - - - - -	Thursday.

1879-80.

1879.		
Sept. 1-2.	Examinations for Admission -	Monday and Tuesday.
Sept. 3.	First Term begins - - - -	Wednesday.
Nov. 25.	Thanksgiving Day - - - - -	Thursday.
Dec. 22.	First Term ends - - - - - -	Monday.
1880.		
Jan. 12.	Second Term begins - - - -	Monday.

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The Lehigh University.

ORIGIN.

The Hon. Asa Packer of Mauch Chunk, during the year 1865, appropriated the sum of Five Hundred Thousand Dollars, to which he has since added one hundred and fifteen acres of land in South Bethlehem, to establish an educational institution in the rich and beautiful Valley of the Lehigh. From this foundation rose The Lehigh University.

DESIGN.

The original object of Judge Packer was to afford the young men of the Valley a complete technical education for those professions which had developed the peculiar resources of the surrounding region. Instruction was to be liberally provided in Civil, Mechanical and Mining Engineering; Chemistry, Metallurgy and Construction, and in all needful collateral studies. French and German were made important elements in the collegiate course. A School of General Literature was a part of the original plan, together with tuition in the ancient Classics, while the Institution was freely opened to pupils from every part of the country and the world.

It is proposed, as soon as practicable, to establish various other technical professorships, and at the same time to develop and enlarge the Classical Department, and to have all the appointments of a complete University.

FREE TUITION.

It will be observed that all these educational facilities are provided without charge. Through the generosity of the Founder, the Trustees were enabled, in 1871, to declare tuition FREE in all branches and classes. The Lehigh University is open to young men of suitable talents and training from every part of our own land and of the world. We specially call to this fact the attention of the pupils of our public schools and of the graduates of classical institutions. Thus is offered, *without charge*, every facility for mastering the professions of the Civil, Mechanical and Mining Engineer, and of the Metallurgist and Analytical Chemist. In the Classical and Scientific departments of the School of General Literature instruction is given to those who wish to become Lawyers, Clergymen, Physicians, Editors, or Merchants.

PUBLIC WORSHIP.

Prayers are attended in the Chapel every morning, and all the students are required to be present.

Divine Service is held on every Sunday morning, according to the forms of the Protestant Episcopal Church, in the Chapel of the University. Attendance at this service is required of every student, except in case of those connected with other religious bodies, to whom the President will grant permission at the beginning of each term (if requested by the parent or guardian, or by the student himself if he be 21 years of age) to attend during that term the place of worship of the body with which he is connected, where attendance on Sunday morning will in such cases be required.

SITE.

Nothing is wanting in the situation of the Institution. The salubrity of the climate and the beauty of the scenery cannot be surpassed. Situated in a region famous for its vast railway and manufacturing enterprises, near some of the richest iron and coal mines in our land, accessible to the great mechanical works of New York and Philadelphia, the students have rare facilities for confirming the teachings of the recitation room by the observation of the eye.

COMMUNICATIONS.

The University Buildings are about a half-mile from the depot, at the junction of the Lehigh Valley and North Pennsylvania Railroads, thus affording communication with all sections of the country. New York is about ninety, and Philadelphia fifty-four miles distant.

BUILDINGS.

Packer Hall, named after the Founder, stands seven hundred feet back of Packer Avenue, at the base of the Lehigh Mountain. Built of handsome stone, it presents to the north a noble and imposing front. At the western extremity is a belfry tower containing the President's Room and the Archive Room. The eastern end is a large advanced wing in which are Lecture and Recitation Rooms, and also a thoroughly equipped Chemical Laboratory. The central portion, eighty feet long, contains the Chapel, Drawing Room and Cabinets. To the east of Packer Hall stands the University Library, erected by the Founder in memory of Mrs. Lucy Packer Linderman his daughter. To the west, within the grounds, are the houses of the President and Professors, comporting architecturally with Packer Hall. Towards the northeastern extremity stand Christmas Hall and Saucon Hall, commodious brick edifices, containing students' rooms, heated by steam and lighted by gas, and a mess hall. At the southwestern extremity stands the Sayre Observatory, the gift of Robert H. Sayre, Esq., of South Bethlehem, containing an Equatorial and Zenith Telescope, Transit Instruments and Astronomical Clock.

EXPENSES.

As before stated, tuition is FREE in all branches and classes. Books, materials, paper, pencils, chemical materials used in the analytical laboratory, and instruments, are furnished by the student.

Rooms and board are provided in the University buildings, under the following rules:

1. The amount of room-rent, board, &c., for each term, must be paid in advance to the Treasurer of the Executive Committee, who will furnish the student with board ticket and key of room.

2. The charge for board and room-rent shall be $5 per week. Where two students occupy a room jointly, the charge shall be $4.50 per week for each.

3. The charge for board without room shall be $4 per week. The charge for room-rent without board shall be $2 per week for each room.

4. These prices include gas and heat.

5. Meal tickets will be furnished by the steward to students or friends visiting them, at 50 cents each, payable in advance to the steward.

6. The choice of rooms shall be in the order of the classes; in any class the first applicant to have the first choice.

7. Students may retain their rooms from year to year by giving notice of their intention so to do at the close of the academic year, and by procuring their tickets therefor on or before the first day of the next term.

8. Students are required to keep their rooms in order, or to employ some proper person to do so for them.

9. No furniture for rooms will be provided by the University.

10. The use of kerosene, coal oil or burning fluid, in any of the buildings, is prohibited.

NOTE.—Where clubs are formed the expenses of the student need not exceed $3.50 per week.

DIPLOMAS AND CERTIFICATES.

The Diploma is given only to those who have passed examinations in a regular course in the classes and in one of the Schools. For all partial courses a certificate is given of what the student has accomplished.

POSTGRADUATE DEGREES.

M. A.

The Faculty will recommend for the Degree of Master of Arts, candidates otherwise properly qualified, who, after taking the Degree of Bachelor of Arts, shall pursue for at least two years, at the University, a course of liberal study approved by the Faculty, pass a thorough examination on the same, and present satisfactory theses.

Ph. D.

The Faculty will recommend for the Degree of Doctor of Philosophy candidates, otherwise properly qualified, who, after taking either of

the Degrees of Civil, Mechanical or Mining Engineer, or Analytical Chemist, shall pursue, for two years, at the University, a course of advanced Scientific study in the line of their profession, pass a thorough examination in the same, and present satisfactory theses.

D. Sc.

The Faculty will recommend for the Degree of Doctor of Science, candidates otherwise properly qualified, who after taking the Degree of Bachelor of Science, shall pursue for at least two years, at the University, a course of Scientific study, embracing two subjects approved by the Faculty, pass a thorough examination, showing in one of the subjects special attainments, and shall present satisfactory theses, based upon an original scientific investigation.

The requirement of residence may be omitted in special cases by the Faculty.

The fee for either of these Diplomas is $10, payable before receiving it.

ADMISSION OF STUDENTS.

Application for admission into the University should be made to the President, from whom all information may be obtained.

REGULAR STUDENTS.

All applicants for regular standing in the classes or schools must be prepared to pass an examination according to the programme of studies. From this it will be seen that a student may be admitted at any time if able to pass a satisfactory examination in the studies already pursued by his class. The only exception will be in the case of any young man who is very nearly but not thoroughly prepared to enter in full standing in any class. Such an one may, at the discretion of the Faculty, be admitted conditionally, to make up his deficiencies by extra study under their direction. When they are made up, he will be received in full standing in his class.

SPECIAL STUDENTS

May enter, selecting such studies as they please, upon a satisfactory examination, with the sanction of the Faculty.

REQUIREMENTS FOR ADMISSION.

Applicants for admission into the first class must be at least *sixteen* years of age, and must present testimonials of good moral character.

SCHOOL OF GENERAL LITERATURE.

CLASSICAL COURSE.

Mathematics.—Arithmetic complete, including the Metric System, Olney's complete School Algebra, or Davies' new Bourdon's Algebra, through equations of the second degree. Chauvenet's Geometry, six books.

English.—Correct Spelling, to be determined by writing from dictation in idiomatic English. Geography. English Grammar. Physical Geography.

Latin.—A thorough knowledge of Latin Grammar. Cæsar's Commentaries, four books. Virgil's Æneid, four books. Cicero's four Orations against Catiline.

Greek.—A thorough knowledge of Greek Grammar is required. Xenophon's Anabasis, four books. Homer's Iliad, four books.

SCIENTIFIC COURSE AND THE TECHNICAL COURSE IN CIVIL, MECHANICAL AND MINING ENGINEERING, METALLURGY AND CHEMISTRY.

Mathematics.—Arithmetic complete, including metric system. Olney's complete School Algebra, or Davies' new Bourdon's Algebra, through equations of the second degree; first six books of Chauvenet's Geometry.

English.—Correct spelling, to be determined by writing from dictation in idiomatic English. Mitchell's School Geography. Parker's English Grammar. Mitchell's or Guyot's Physical Geography, or equivalent.

PROGRAMME OF STUDIES.

SHOWING THE NUMBER OF HOURS AND EXERCISES PER WEEK FOR EACH SUBJECT, AND THE TEXT-BOOKS USED.

The following is presented as the general programme of instruction, subject to such modifications from time to time as the Faculty may deem expedient, with the approval of the Trustees.

The names of the Authors studied are also given. The number of Exercises per week in each subject is indicated by the figure in parenthesis immediately following.

Two hours of Drawing, three of work in the Laboratory, or three of practice in the field are regarded as equivalent to a recitation or lecture of one hour's duration.

THE SCHOOL OF GENERAL LITERATURE.

This school is intended to correspond, with some important differences, to the course long established in our older colleges, modified by the needs and requirements of modern culture. Its object is to impart a comprehensive and liberal education to those who design to enter upon professional rather than technical studies.

It comprises two distinct but parallel courses: I. The Classical Course. II. The Course in General Science.

THE CLASSICAL COURSE.

This school is chiefly designed for those who propose to study Law, and Theology; it includes full and rigorous instruction in the Ancient Classics, in Elementary Science and in General Literature. The study of Mathematics in this course embraces Algebra, Geometry, Trigonometry, Descriptive and Analytical Geometry, and the Calculus. The programme includes Physics, Chemistry and Elementary Mechanics. There are also full courses in History, in the Science of language and in the origin and growth of the English Language. There are also lectures on Psychology, the Christian Evidences, International and Constitutional Law and Political Economy. Lectures on English Literature are supplemented by critical readings of the standard English authors. Successful study in this course leads to the degree of B. A. (Bachelor of Arts).

THE COURSE IN GENERAL SCIENCE.

This course comprises most of the studies of the Classical Course, and is chiefly intended for those who, from circumstance or inclination, do not desire to study Latin and Greek. These being omitted, more extended instruction is given in French and German.

More time is also given to General Science. The instruction given in this Course, will be particularly valuable to those who design to enter upon commercial pursuits, or matters of general industry. The degree of B. Sc. (Bachelor of Science) is conferred upon the graduate in this course.

CLASSICAL COURSE.

FRESHMAN CLASS.

FIRST TERM.

Latin.—Livy: Books XXI. and XXII. Horace: Odes. (4)

Greek.—Herodotus' Persian Wars, or Homer's Odyssey. Classic Mythology. (4)

History.—Weber's Outlines of History. (2)

Mathematics.—Chauvenet's Geometry (completed). (4)

Essays and Declamations. (1)

Drawing. (1)

SECOND TERM.

Latin.—Cicero: De Senectute and deAmicitia. Latin Prosody. (4)

Greek.—Xenophon's Memorabilia of Socrates, or Cyropædia. Greek and Roman Antiquities. (4)

History.—Weber's Outlines of History. (2)

Mathematics.—Olney's University Algebra, Part III. (5)

Essays and Declamations. (1)

SOPHOMORE CLASS.

FIRST TERM.

Latin.—Tacitus ; Agricola. (3)

Greek.—Demosthenes' Philippics, or the Universal History of Polybius. (4)

English.—Coppée's English Literature. (4)

Mathematics.—Plane and Spherical Trigonometry and Mensuration. Use of Logarithmic Tables: Olney's General Geometry. (4)

Essays and Original Orations. (1)

Latin.—Horace: Satires and Epistles. (4)
Greek.—Euripides: Medea or Alcestis. (3)
Rhetoric.—Coppée's Rhetoric. (2)
English.—Lectures on the Science of Language: Müller and Farrar. (2)
Mathematics.—Differential and Integral Calculus. Courtenay. (4)
Essays and Original Orations. (1)

JUNIOR CLASS.

FIRST TERM.

Latin.—Tacitus: Annals. (2)
Greek.—Plato's Gorgias. (2)
History.—Lectures. (4)
Logic.—Coppée's Logic. (3)
Fine Arts.—Lectures. (1)
Physics.—Deschanel's Mechanics and Lectures, with Laboratory Practice. (2)
Anatomy and Physiology.—Lectures. (1)

SECOND TERM.

Latin.—Satires of Juvenal. (2)
Greek.—Thucydides. (2)
History.—Lectures on the Philosophy of History. (2)
English.—Lectures on the English Language: Schele de Vere. (1)
Chemistry.—Lectures. Fownes' Elementary Chemistry. (3)
Physics.—Galvanism, Acoustics, Light. Deschanel with Lectures and Laboratory Practice. (5)

SENIOR CLASS.

FIRST TERM.

Latin.—Horace: Ars Poetica, or the Adelphi of Terence. (2)
Greek —Theocritus. (2)
Psycholgy.—Lectures. (1)
International Law and History.—Lectures. (1)
English Literature and History.—Lectures. (3)

Descriptive Astronomy.—Loomis Treatise, with Lectures. (3)

Physics.—Heat, Meteorology, Barometrical Leveling and Measurement of Heights, Magnetism and Statical Electricity. Lectures with Laboratory Practice. (3)

SECOND TERM.

Latin.—Cicero de Officiis. (3)

Greek.—Demosthenes' and Æschines de Corona, or Æschylus' Prometheus Vinctus. (2)

Psychology and Christian Evidences.—Lectures. (2)

Political Economy.—Lectures. (1)

Constitutional Law and History.—Lectures. (2)

Chemistry.—Lectures and Laboratory Practice. Galloway's Qualitative Analysis. (3)

Geology.—Lectures. Dana. (2)

Preparation of Thesis.

SCIENTIFIC COURSE.

FRESHMAN CLASS.

FIRST TERM.

Mathematics.—Chauvenet's Geometry, (completed). (4)

French.—Fasquelle's Introductory French Course. Gibert's second French Reader. (3)

German.—Otto's Grammar. Writing in German Text. Translation into English. (4)

History.—Weber's Outlines of History. (2)

Elementary Drawing. (2)

Essays and Declamations.. (1)

SECOND TERM.

Mathematics.—Olney's University Algebra, Part III. (5)

French.—Languillier's and Monsanto's Practical French Course. Chouquet's first Readings from Modern French Writers. (3)

German.—Otto's Grammar. Schlegel's second Classical German Reader. (2)

History.—Weber's Outlines of History. (2)

Drawing. (3)

Essays and Declamations. (1)

SOPHOMORE CLASS.

FIRST TERM.

Mathematics.—Plane and Spherical Trigonometry and Mensuration. Use of Logarithmic Tables. Olney's General Geometry. (4)

French.—Languillier's and Monsanto's Practical French Course. Chouquet's First Readings from Modern French writers. Practical Exercises in Translation from French into English. (3)

German.—Otto's German Grammar. Schlegel's Second Classical Reader. Practical Exercises in Translation from German into English. (3)

English.—Coppée's English Literature. (4)

Drawing. (1)

Essays and Original Orations. (1)

SECOND TERM.

Mathematics.—Differential and Integral Calculus. Courtenay's. (4)

Descriptive Geometry.—General Orthographic Projections. Isometric Drawing. Warren's. (3)

French.—Poitevin: Grammaire Élémentaire, in French. Written Exercises. Chapsal: Leçons et Modèles de Littérature Française. (2)

German.—Scientific Readings. Exercises. (2)

Rhetoric.—Coppée's Rhetoric. (2)

English.—Lectures on the Science of Language. Müller and Farrar. (2)

Essays and Original Orations. (1)

JUNIOR CLASS.

FIRST TERM.

Physics.—Deschanel's Mechanics and Lectures, with Laboratory Practice. (2)

Anatomy and Physiology.—Lectures. (1)

French.—Poitevin, continued with Exercises. Systematic Scientific Readings. Chapsal continued. (2)

German.—Systematic Scientific Readings. Translatiom from German into English. Compositions in German. (2)

History.—Lectures. (4)

Logic.—Coppée's Logic. (3)

Fine Arts.—Lectures. (1)

SECOND TERM.

Chemistry.—Lectures. Fownes' Elementary Chemistry. (3)

Physics.—Galvanism. Acoustics. Light. Deschanel, with Lectures and Laboratory Practice. (5)

French.—Systematic Readings. Composition. Bougeault: Précis de la Littérature Française. (2)

German.—Systematic Scientific Readings. Composition. Translations. Lectures on German Literature. (2)

History.—Lectures on the Philosophy of History. (2)

English. – Lectures on the English Language. Schele deVere. (1)

SENIOR CLASS.

FIRST TERM.

Physics.—Deschanel's Heat, Magnetism and Statical Electricity. Barometrical Leveling and Measurement of Heights. Lectures, with Laboratory Practice. (3)

Descriptive Astronomy.—Loomis' Treatise, with Lectures. (3)

Surveying.— Gillespie's Surveying. (2)

Crystaliography.—Lectures with Practical Exercises in the Determination of Crystals. (2)

Psycholgy.—Lectures. (1)

International Law.—Lectures. (1)

English Literature and History.—Lectures. (3)

SECOND TERM.

Chemistry.—Lectures and Laboratory Practice. Galloway's Qualitative Analysis. (5)

Mineralogy.—Descriptive and Determinative, with Practice. E. S. Dana. (3)

Geology.—Lectures. Dana's Treatise. (2)

Psychology and Christian Evidences.—Lectures. (2)

Political Economy.—Lectures. (1)

Constitutional Law and History.—Lectures. (2)

Preparation of Thesis.

TECHNICAL COURSES.

The first three terms (one year and a half) have the same curriculum of studies for all the Technical Schools. At the end of that time the student selects his course and follows the programme laid down for the School selected.

FRESHMAN CLASS.

FIRST TERM.

Mathematics.—Chauvenet's Geometry, (completed). (4)

Physics.—Deschanel's Mechanics and Lectures. With Laboratory Practice. (2)

French.—Fasquelle's Introductory French Course. Gibert's second French Reader. (3)

German.—Otto's Grammar. Writing in German Text. Translation of German into English. (4)

Elementary Drawing.—Warren. (2)

Essays and Declamations. (1)

SECOND TERM.

Mathematics.—Olney's University Algebra, Part III. (5)

Chemistry.—Lectures. Fownes' Elementary Chemistry. (3)

French.—Languillier's and Monsanto's Practical French Course. Chouquet's first Readings from Modern French Writers. (3)

German.—Otto's Grammar. Schlegel's second Classical German Reader. (2)

Drawing.—Warren's Projection Drawing. (2)

Essays and Declamations. (1)

SOPHOMORE CLASS.

FIRST TERM.

Mathematics.—Plane and Spherical Trigonometry and Mensuration. Use of Logarithmic Tables. Olney's General Geometry. (4)

Chemistry.—Lectures and Laboratory Practice. Galloway's Qualitative Analysis. (5)

Physics.—Heat, Meteorology, Barometrical Leveling and Measurement of Heights, Magnetism and Statical Electricity. Lectures, with Laboratory Practice. (3)

French or German.—As in the Scientific Course of the School of General Literature. (3)

Essays and Original Orations. (1)

THE SCHOOL OF CIVIL ENGINEERING.

The general scope of this School comprises the higher branches of the applied mechanics and mathematics, together with the principles of construction and exercises in mapping, drawing and designing. Thus, the student is made acquainted with the Theory of Elasticity or Flexure, including the strength of materials, the principles of construction of roof-trusses, beams, girders and bridges, as well as the practical designing of such structures, the determination of their proper dimensions and the preparation of working drawings. Under this head belongs also the Theory of the Stability of Structures, including the theory of the arch and the construction of retaining walls; together with the Theory of Motion as applied to machines, the principles of Hydrostatics and Hydraulics with their applications to water-pressure engines, vertical water wheels and turbines.

In all cases, practical examples, such as occur in actual engineering practice, are taken up and discussed, and, together with the analytical or algebraic methods, the student is also instructed in practical graphical solutions of the various problems, wherever such solutions present a special value in practice. Much time is devoted to surveying operations and to actual practice in the field. Profiles, Plans of Topographical Surveys, Contour Maps, and Railroad Charts, are made. The practical operations connected with the reconnoissance, location and surveys of roads, canals and railroads, such as cross sectioning, setting grade stakes, laying out of curves and calculation of excavation and embankment, are fully illustrated in the field. Thorough instruction is given in Drawing, the construction of working drawings of structures, the designing of bridges and roofs, topography and hydrographical charts.

Attention is also paid to the application of the general principles of the science of Engineering, or to Engineering considered as an

art. Under this latter head may be classed the composition and qualities of materials used in construction, iron, steel, wood, stone; their dressing and preservation; foundations, earth and rock-work; harbor and river improvements, drainage, collection and distribution of water.

So much of Mechanical Engineering is necessarily included, as refers to the construction of bridges, and the special machinery and appliances used in the erection of structures.

Designs for, and reviews of, special structures, specifications and estimates of quantities and cost, and the preparation of a graduation Thesis giving evidence of satisfactory attainments, complete the course. The graduate of this School will receive the degree of C. E. (Civil Engineer.)

Graduates of the School of Civil Engineering, by remaining one year and pursuing one of the courses of studies elsewhere laid down may receive the degree of M. E. (Mechanical Engineer) or E. M. (Engineer of Mines.)

SCHOOL OF CIVIL ENGINEERING.

SOPHOMORE CLASS.

SECOND TERM.

Mathematics.—Differential and Integral Calculus. Courtenay. (4)

Descriptive Geometry.—General Orthographic Projections. Isometric Drawing. Warren. (3)

Surveying.—Use of Compass, Level and Transit. Maps of Farm Surveys Profiles. Contour Maps. Gillespie. (3)

Construction.—Civil Engineering. Mahan. (1)

Physics.—Galvanism. Acoustics. Light. Deschanel with Lectures and Laboratory Practice. (5)

JUNIOR CLASS.

FIRST TERM.

Mathematics.—Integral Calculus. Courtenay. (2)

Mechanics.—Smith. Mathematical Theory of Motion. Science of Motion in General. Statics. Dynamics and Statics of Fluids. Lectures on Theory of Centre of Gravity and Moment of Inertia. (5)

Descriptive Geometry.—Warped Surfaces. Shades and Shadows. Linear Perspective. Warren. (3)

Surveying.—Triangulation. Leveling. Plane Table Work. Topographical Maps. Gillespie. Smith. (5)

Crystallography.—Lectures. (1)

SECOND TERM.

Applied Mechanics.—Resistance of Materials. Theory of Flexure. Wood. DuBois' Weyrauch. (3)

Kinematics.—Principles of Mechanism. Willis. (3)

Stereotomy.—Stone Cutting. Machine Drawing. Working Drawings. Warren. (3)

Surveying.—Mine Surveying. Road and Railroad Surveying. Location of a Railroad Line. Profile, Map and Estimate of Cost. Gillespie. Henck. (3)

Mineralogy.—Descriptive and Determinative, with Practice. E. S. Dana. (3)

Construction.—Die Brücken in Eisen.—Heinzerling. Visits of Inspection. (1)

SENIOR CLASS.

FIRST TERM.

Applied Mechanics.—Theory of Retaining Walls, Arches, Roofs and Bridges. Graphical Statics. (5)

Construction.—Principles of Construction. Erection of Structures. Reports on and Designs for Simple Structures. Visits of Inspection. (3)

Surveying.—Hydrography and Geodesy. (2)

Astronomy.—Descriptive Astronomy. Loomis. (3)

Psychology.—Lectures by the President. (1)

English Literature and History.—Lectures. (2)

SECOND TERM.

Applied Mechanics.—Hydraulics and Hydraulic Motors. Steam and Steam Engines. Weisbach. (5)

Construction.—Specifications and Contracts. Original Designs and Estimates for Engineering Projects. Visits of Inspection. (5)

Astronomy.—Practical Astronomy as applied to Geodesy and Navigation. Lectures and Observatory work. Determination of Latitude, Longtitude and Azimuth. Practice with the Sextant, Transit and Zenith Telescope. (2)

Geology.—Lectures. Dana. (2)

Psychology and Christian Evidences.—Lectures by the President. (2)

Preparation of Theses.

POST GRADUATE COURSE FOR MECHANICAL ENGINEERS FOR THE DEGREE OF CIVIL ENGINEER.

FIRST TERM.

Surveying.—Triangulation. Leveling. Plane Table Work. Topographical Maps. Gillespie. Smith. (5)

Construction.—Principles of Construction. Erection of Structures. Reports on and Designs for Simple Structures. (3)

Surveying.—Hydrography and Geodesy. (2)

SECOND TERM.

Stereotomy.—Stone Cutting. (2)

Surveying.—Mine Surveying. Road and Railroad Surveying. Location of a Railroad Line. Profile, Map and Estimate of Cost. Gillespie and Henck. (3)

Construction.—Original Designs and Estimates for Engineering Projects. (3)

Astronomy.—Practical Astronomy as Applied to Geodesy and Navigation. Lectures and Observatory Work. Determination of Latitude, Longitude and Azimuth. Practice with the Sextant, Transit and Zenith Telescope. (2)

Preparation of Theses.

THE SCHOOL OF MECHANICAL ENGINEERING.

While the problems which the Civil Engineer is called upon to solve are mainly statical problems, involving the idea of rest or equilibrium, and the ends to be obtained in his constructions are stiffness, rigidity and immobility; the object of the Mechanical or Dynamical Engineer, on the other hand, is not to avoid or prevent,

but to cause motion, not to oppose the action of the forces of nature, but so to guide and use them as to obtain the desired results in the best manner and with the least expenditure of force and material. The two professions are thus, in the nature of the problem with which they have to do, to a certain extent antithetical. The sciences, however, of which both make use, and the fundamental principles, by the application of which the desired results are in each case obtained, are, to a considerable extent, identical.

Thus, the higher branches of the mathematics and of applied mechanics, as well as the principles of constructions, are common to both Schools. So also as regards the Theory of Elasticity or Flexure and the Strength and Properties of Materials. Much, therefore, of the course as already indicated for the School of Civil Engineering, finds here also a place, as will appear from an examination of the more detailed course of study given below.

In the practical application of the principles common to both, however, the two Schools diverge. Thus special attention is directed to the applications of the principles of mechanics to machinery, in the construction of stationary, locomotive and marine engines, hydraulic motors of various kinds, blast furnaces and their appurtenances, foundries, rolling mills and steel works. Information is afforded of the methods of casting and working in iron and other metals, and of making and using the tools employed in these processes.

Much attention is paid to the execution of working drawings, and to the Theory of Mechanism. The proximity of numerous blast furnaces, rolling mills, foundries, machine shops and factories, enables the student to see the practical workings of such establishments and to obtain valuable practical information in the various branches of mechanical engineering.

Visits of inspection to the workshops, mills and blast furnaces in the neighborhood, with explanations of the machinery and tools used, form an important feature of the course.

The graduate in this School will receive the degree of M. E. (Mechanical Engineer.)

Graduates of the School of Mechanical Engineering, by remaining an additional year and pursuing the course of studies elsewhere laid down, may receive the degree of C. E. (Civil Engineer.)

THE SCHOOL OF MECHANICAL ENGINEERING.

SOPHOMORE CLASS.

SECOND TERM.

Mathematics.—Differential and Integral Calculus. Courtenay. (4)

Descriptive Geometry.—General Orthographic Projections. Isometric Drawing. Warren. (3)

Surveying.—Use of Compass, Level and Transit. Maps of Farm Surveys. Profiles. Contour Maps. Gillespie. (3)

Physics.—Galvanism. Acoustics. Light. Deschanel, with Lectures and Laboratory Practice. (5)

Blow-Pipe Analysis.—Lectures with Practice. Plattner, Brush, or Nason and Chandler. (1)

JUNIOR CLASS.

FIRST TERM.

Mathematics.—Integral Calculus. Courtenay. (2)

Mechanics.—Smith. Mathematical Theory of Motion. Science of Motion in general. Statics. Dynamics and Statics of Fluids. Lectures on Theory of Centre of Gravity and Moment of Inertia. (5)

Descriptive Geometry.—Warped Surfaces. Shades and Shadows. Linear Perspective. Warren. (3)

Stereotomy.—Elements of Machine Drawing. Working Drawings. (3)

Construction.—Pattern Making, Moulding and Casting. Visits of Inspection. Rose. (2)

Crystallography.—Lectures. (1)

SECOND TERM.

Applied Mechanics.—Resistance of Materials. Theory of Flexure. Wood. DuBois' Weyrauch. (3)

Kinematics.—Principles of Mechanism. Willis. (3)

Machine Drawing.—Working Drawings of Machinery. Elements of Machine Designs. Sketches of Machines. (3)

Metallurgy.—Metallurgical Processes. Furnaces. Refractory Building Materials. Combustion. Natural and Artificial Fuels. Metallurgy of Iron. (3)

Mineralogy.—Descriptive Mineralogy, with Practical Exercises in the Determination of Minerals. E. S. Dana. (3)

Construction.—Die Brücken in Eisen.—Heinzerling. Visits of Inspection. (1)

SENIOR CLASS.

FIRST TERM.

Applied Mechanics.—Theory of Retaining Walls, Arches, Roofs and Bridges. Graphical Statics. (5)

Construction.—Forging and Riveting. Workshop Appliances and Processes. Reports on and Designs for Simple Machines. Visits of Inspection. (3)

Thermodynamics.—Theory of Heat. Shann. (2)

Astronomy.—Descriptive Astronomy. Loomis. (3)

Psychology.—Lectures by the President. (1)

English Literature and History.—Lectures. (2)

SECOND TERM.

Applied Mechanics.—Hydraulics and Hydraulic Motors. Steam and the Steam Engine. Weisbach. (5)

Kinematics.—Link and Valve Motion. Zeuner. (2)

Construction.—Specifications and Contracts. Original Designs and Estimates for Machines. Visits of Inspection. (5)

Geology.—Lectures. Dana. (2)

Psychology and Christian Evidences.—Lectures by the President. (2)

Preparation of Theses.

POST GRADUATE COURSE FOR CIVIL ENGINEERS FOR THE DEGREE OF MECHANICAL ENGINEER.

FIRST TERM.

Stereotomy.—Elements of Machine Drawing. Working Drawings. (3)

Construction.—Pattern Making, Moulding and Casting. Forging and Riveting. Workshop Appliances and Processes. Reports on and Designs for Simple Machines. (5)

Thermodynamics.—Theory of Heat. Shann. (2)

SECOND TERM.

Kinematics.—Link and Valve Motion. Zeuner. (2)

Machine Drawing.—Elements of Machine Designs. Sketches of Machines. Working Drawings. (2)

Construction.—Original Designs and Estimates for Machines. (3)

Metallurgy.—Metallurgical Processes, Furnaces. Refractory Building Materials. Combustion. Natural and Artificial Fuels. Metallurgy of Iron. (3)

Preparation of Theses.

THE SCHOOL OF MINING AND METALLURGY.

The full course in this School comprises, besides the Mathematical, Physical, Chemical and Literary studies necessary to all technical education, courses in Mining, Metallurgy, Geology, Mineralogy, Machines, qualitative and quantitative Analysis, Assaying, Blow-pipe Analysis, Topographical and Mine Surveying and Drawing. On account of the great number and scope of the studies necessary to the completion of the full course, it is four years and a half in length.

The graduate in this School, who has taken the full course, will receive the degree of E. M. (Engineer of Mines.)

A partial course may be taken in this School by those who wish to pursue the study of Metallurgy. The course of Metallurgy includes the studies of the full course, except those of Mining and Surveying. The length of the course is four years.

The graduate of this School in the Metallurgical course will receive the degree of Metallt. (Metallurgist.)

A Post Graduate course has been arranged in this School, comprising courses in Mining, Metallurgy, Chemical Analysis and Blow-pipe Analysis, with supplementary courses in Geology and Mineralogy.

Graduates in the School of Civil Engineering, by remaining one year and taking this course, may obtain the degree of E. M.

In the courses of Mineralogy, Geology and Analytical Chemistry, much attention is paid to the practical instruction of the student in determining minerals by their crystallographical and physical

properties, and by the aid of blow-pipe analysis, in the determination of rocks; in the qualitative and quantitative examination of ores and metallurgical products and in the rapid methods of assaying ores by the dry and wet ways employed in metallurgical laboratories. The vicinity to the iron works of the Lehigh Valley and especially to the works of the Bethlehem Iron Company, with its blast furnaces, foundry and machine shops, and Bessemer, puddle, iron and steel rail mills, affords unusual facilities for the practical study of iron metallurgy. The processes of the manufacture of spelter and oxide of zinc may be studied at the works of the Lehigh Zinc Company. The facilities for the practical study of mining and economic geology are hardly less great. The mines of the Lehigh Zinc Company and the brown hematite and slate deposits of the Lehigh Valley are in the immediate vicinity, while within easy reach by rail are the anthracite coal fields of Pennsylvania, the iron and zinc mines of New Jersey, and the celebrated iron mines at Cornwall, Pa.

THE SCHOOL OF MINING AND METALLURGY.

SOPHOMORE CLASS.

SECOND TERM.

Mathematics.—Differential and Integral Calculus. Courtenay. (4)

Descriptive Geometry.—General Orthographic Projections. Isometric Drawing. Warren. (3)

Surveying.—Use of Compass, Level and Transit. Maps of Farm Surveys. Profiles. Contour Maps. Gillespie. (3)

Physics.—Galvanism, Acoustics and Light. Deschanel, with Lectures and Laboratory Practice. (5)

Blow-Pipe Analysis.—Lectures and Practice. Plattner, Brush or Nason and Chandler. (1)

JUNIOR CLASS.

FIRST TERM.

Mechanics.—Smith. Mathematical Theory of Motion. Science of Motion in general. Statics. Dynamics and Statics of Fluids. Lectures on Theory of Centre of Gravity and Moment of Inertia. (5)

Surveying.—Triangulation. Leveling. Plane Table Work. Topographical Maps. Gillespie. Smith. (5)

Crystallography.—Lectures with Practical Exercises in the Determination of Crystals. (2)

Chemical Philosophy.—Cooke. (4)

SECOND TERM.

Surveying.—Mine Surveying. (1)

Metallurgy.—Metallurgical Processes. Furnaces. Refractory Building Materials. Combustion. Natural and Artificial Fuels. Metallurgy of Iron. (3)

Mineralogy.—Descriptive Mineralogy, with Practical Exercises in the Determination of Minerals. E. S. Dana. (3)

Blow-Pipe Analysis.—Practice. (1)

Applied Mechanics.—Resistance of Materials. Theory of Flexure, Wood. DuBois' Weyrauch. (3)

Chemical Philosophy.—Cooke. (3)

Chemistry.—Quantitative Analysis. Laboratory Practice. (2)

SENIOR CLASS.

FIRST TERM.

Applied Mechanics.—Theory of Retaining Walls, Arches, Roofs and Bridges. (3)

Geology.—Lithology, with Practical Exercises in the Determination of Rocks. Lectures. (3)

Metallurgy.—Of Copper, Lead, Silver, Gold, Platinum, Mercury, Tin, Zinc, Nickel, Cobalt, Arsenic, Antimony and Bismuth. (4)

Chemistry.—Quantitative Analysis. Laboratory Work. Fresenius. (3)

Psychology.—(1)

Astronomy.—Descriptive Astronomy. Loomis. (3)

SECOND TERM.

Applied Mechanics.—Hydraulics and Hydraulic Motors. Steam and Steam Engines. Weisbach. (5)

Mining.—Modes of Occurrence of the Useful Minerals. Searching for Mineral Deposits. Examination of Mining Properties. Boring. Mining Tools, Machines and Processes. Timbering and Masonry. Methods of Exploitation. Callon. André. (3)

Geology.—Historic, Dynamic and Economic Geology. Dana. (3)

Astronomy.—Practical Astronomy as applied to Geodesy and Navigation. Lectures and Observatory Work. Determination of Latitude, Longitude and Azimuth. Practice with the Sextant, Transit and Zenith Telescope. (2)

Psychology and Christian Evidences.—Lectures by the President. (2)

Assaying.—Including the Assay by the Dry Methods of Gold, Silver, Copper, Lead, Iron and Tin Ores. Laboratory Work. Ricketts. (1)

FIFTH YEAR.

FIRST TERM.

Mining.—Underground Transportation. Hoisting, Drainage and Pumping. Ventilation and Lighting. Mechanical Preparation of Ores. Coal Washing. Callon. André. (4)

Chemistry.—Quantitative Analysis. (7)

Psychology.—Lectures by the President. (1)

English Literature and History.—Lectures. (2)

Preparation of Theses.

METALLURGICAL COURSE.

SOPHOMORE CLASS.

SECOND TERM.

Mathematics.—Differential and Integral Calculus. Courtenay. (4)

Descriptive Geometry.—General Orthographic Projections. Warren. (3)

Physics.—Galvanism. Acoustics. Light. Deschanel, with Lectures and Laboratory Practice. (5)

Blow-Pipe Analysis.—Lectures with Practice. Plattner, Brush or Nason and Chandler. (1)

Assaying.—Including the Assay by the Dry Methods of Gold, Silver, Copper, Lead, Iron and Tin Ores. Laboratory Work. Ricketts. (1)

Structure Drawing.—Furnaces and Metallurgical Apparatus. (2)

JUNIOR CLASS.

FIRST TERM.

Mechanics.—Smith. Mathematical Theory of Motion. Science of Motion in general. Statics. Dynamics and Statics of Fluids. Lectures on Theory of Centre of Gravity and Moment of Inertia. (5)

Chemical Philosophy.—Cooke. (4)

Chemistry.—Quantitative Analysis. Laboratory Work. Fresenius. (3)

Crystallography.—Lectures with Practical Exercises in the Determination of Crystals. (2)

Machine Drawing.—Elements of Machine Drawing. Working Drawings. (2)

SECOND TERM.

Applied Mechanics.—Resistance of Materials. Theory of Flexure. Wood. DuBois' Weyrauch. (3)

Metallurgy.—Metallurgical Processes. Furnaces. Refractory Building Materials. Combustion. Natural and Artificial Fuels. Metallurgy of Iron. (3)

Mineralogy.—Descriptive Mineralogy, with Practical Exercises in the Determination of Minerals. E. S. Dana. (3)

Blow-Pipe Analysis.—Practice. (1)

Chemical Philosophy.—Cooke. (4)

Kinematics.—Principles of Mechanism. Willis. (3)

SENIOR CLASS.

FIRST TERM.

Applied Mechanics.—Theory of Retaining Walls, Arches, Roofs and Bridges. (3)

Metallurgy.—Of Copper, Lead, Silver, Gold, Platinum, Mercury, Tin, Zinc, Nickel, Cobalt, Arsenic, Antimony and Bismuth. (4)

Chemistry.—Quantitative Analysis. Laboratory Work. (3)

Geology.—Lithology, with Practical Exercises in the Determination of Rocks. Lectures. (3)

Psychology.—Lectures by the President. (1)

English Literature and History.—Lectures. (2)

SECOND TERM.

Applied Mechanics.—Hydraulics and Hydraulic Motors. Steam and the Steam Engine. Weisbach. (5)

Kinematics.—Link and Valve Motion. Zeuner. (2)

Chemistry.—Quantitative Analysis. Laboratory Work. (3)

Geology.—Historic, Dynamic and Economic Geology. Lectures. Dana. (3)

Psychology and Christian Evidences.—Lectures by the President. (2)

Preparation of Theses.

POST GRADUATE COURSE FOR CIVIL ENGINEERS FOR THE DEGREE OF MINING ENGINEER.

FIRST TERM.

Mining.—Underground Transportation. Hoisting. Drainage and Pumping. Ventilation and Lighting. Mechanical Preparation of Ores. Coal Washing. (4)

Geology.—Lithology, with Practical Exercises in the Determination of Rocks. Dana. (1)

Metallurgy.—Of Copper, Lead, Silver, Gold, Platinum, Mercury, Tin, Zinc, Nickel, Cobalt, Arsenic, Antimony and Bismuth. (4)

Chemistry.—Quantitative Analysis. Laboratory Work. (6)

Crystallography.—Practical Exercises in the Determination of Crystals. E. S. Dana. (1)

SECOND TERM.

Mining.—Modes of Occurrence of the Useful Minerals. Searching for Mineral Deposits. Examination of Mining Properties. Boring. Mining Tools, Machines and Processes. Timbering and Masonry. Methods of Exploitation. (4)

Metallurgy.—Metallurgical Processes. Furnaces. Refractory Building Materials. Combustion. Natural and Artificial Fuels. Metallurgy of Iron. (3)

Geology.—Historic, Dynamic and Economic Geology. Dana. (3)

Chemistry.—Quantitative Analysis. Laboratory Work. (3)

Assaying.—Including the Assay by the Dry Methods of Gold, Silver, Copper, Lead, Iron and Tin Ores. Ricketts. (1)

Blow-Pipe Analysis.—Practice. (2)

THE SCHOOL OF CHEMISTRY.

The course of instruction in this School continues the subject of Theoretical Chemistry from the general course of the two previous terms, the subjects of Chemical Philosophy and Organic Chemistry being taught by daily recitations until the close of the Junior year.

In Analytical Chemistry, the course of Qualitative Analysis in the first term of the second year is followed by preparation of Chemical Compounds and the Purification of Chemicals.

Subsequently, Quantitative Analysis is pursued to the end of the course, including the Dry Assaying of Ores of Gold, Silver, Copper, Lead, Iron and Tin, and the Wet Analyses, included in the appended schedule. In addition, courses of Lectures on Medical, Agricultural and Technical Chemistry are given, and various industrial establishments in the neighborhood and in Philadelphia and New York are visited, in the company of an instructor. The course also includes thorough instruction in Physics and Mechanics, Mineralogy and Blow-Pipe Analysis, Metallurgy, Geology and Descriptive Astronomy.

The last term of the Senior year is mainly devoted to the preparation of a Thesis on some subject, selected by the Professor, involving practical work in the Laboratory, in addition to the literary labor, and each graduate will thus make a contribution to the progress of the science as a preliminary to the reception of his degree.

The course is thus seen to include thorough instruction in theoretical and applied chemistry, in their various branches, as well as in those cognate and other sciences of such great value to the chemist.

The Laboratories are under the immediate charge of the Professor and his Assistant, and, together with the Lecture-room, are unsurpassed in excellence by any similar establishment in the country, being supplied with all the modern improvements. The collections of apparatus, specimens and models, illustrating theoretical and applied chemistry, are already important and rapidly increasing.

Students are charged for the chemicals and apparatus consumed. If the student is moderately careful, this expense need not exceed $60 per year.

The graduate in this School will receive the degree of A. C. (Analytical Chemist.)

THE SCHOOL OF CHEMISTRY.

SOPHOMORE CLASS.

SECOND TERM.

Mathematics.—Differential and Integral Calculus. Courtenay. (4)

Descriptive Geometry.—General Orthographic Projections. Isometric Drawing. Warren. (3)

Physics.—Galvanism. Acoustics. Light. Deschanel, with Lectures and Laboratory Practice. (5)

Chemical Preparations.—Including the Preparation of Chemical Compounds and the Purification of Chemicals by Distillation, Sublimation, Fusion, Crystallization, Precipitation, etc. (1)

Assaying.—Including the Assay by the Dry Methods of Gold, Silver, Copper, Lead, Iron and Tin Ores. Ricketts. (1)

Blow-Pipe Analysis.—Lectures with Practice. Plattner, Brush, or Nason and Chandler. (1)

JUNIOR CLASS.

FIRST TERM.

Chemical Philosophy.—Cooke. (4)

Toxicology.—Otto on Poisons. (1)

Quantitative Analysis.—Fresenius' Quantitative Analysis. (7)

The following analyses are executed by the students:

1. Iron Wire (Fe.)
2. Potassic Dichromate (Cr_2O_3.)
3. Baric Chloride (Ba. Cl. H_2O.)
4. Magnesic Sulphate (MgO. SO_3. H_2O.)
5. Hydro Di-Sodic Phosphate (P_2O_5.)
6. Bronze (Cu. Sn. Zn.)
7. Rochelle Salt (K_2O. Na_2O.)
8. Volumetric Determination of Chlorine.
9. Acidimetry (HCl. H_2SO_4. HNO_3.)
10. Alkalimetry (KOH. NaOH. NH_4OH.)
11. Chlorimetry (Bleaching Powders.)
12. Silver Coin (Au. Ag. Pb. Cu.)
13. Zinc Ore (Zn.)

Crystallography.—Lectures with Practical Exercises in the Determination of Crystals. (2)

Anatomy and Physiology.—Lectures. (1)

SECOND TERM.

Chemical Philosophy.—Cooke. (4)

Quantitative Analysis.—Fresenius' Quantitative Analysis. (5) The following analyses are executed by the students:

14. Copper Ore (Cu.)
15. Spiegeleisen (Mn.)
16. Lead Ore (Pb.S.)
17. Ilmenite (TiO_2.)
18. Iron Ore (Complete Analysis.)
19. Limestone (Complete Analysis.)
20. Coal (Volatile Matter,—Fixed Carbon, Ash, H_2O, S., P.)
21. Slag (Complete Analysis.)

Metallurgy.—Metallurgical Processes, Furnaces. Refractory Building Materials. Combustion. Natural and Artificial Fuels. Metallurgy of Iron. (3)

Mineralogy.—Descriptive Mineralogy, with Practical Exercises in the Determination of Minerals. E. S. Dana. (3)

SENIOR CLASS.

FIRST TERM.

Organic Chemistry.—Wöhler. (4)

Quantitative Analysis.—Fresenius' Quantitative Analysis. (5) The following analyses are executed by the students:

22. Guano (NH_3. P_2O_5. H_2O.)
23. Clay (Complete Analysis.)
24. Manganese Ore (MnO_2.)
25. Mineral Water (Complete Analysis.)
26. Pig Iron (Complete Analysis.)
27. Nickel Ore (Ni.Co.)
28. Organic Analysis (C. H. O. N.)
29. Gas Analysis (Complete Analysis of Illuminating Gas.)

Astronomy.—Descriptive Astronomy. Loomis. (3)

Psychology.—Lectures by the President. (1)
English Literature and History.—Lectures. (2)

SECOND TERM.

Chemistry Applied to the Arts.—Lectures. (3)
Medical Chemistry.—Lectures. (1)
Agricultural Chemistry.—Lectures. (1)
Geology.—Historic, Dynamic and Economic Geology. Lectures. Dana. (2)
Psychology and Christian Evidences.—Lectures by the President. (2)
Preparation of Theses.

UNIVERSITY LAW LECTURES.

At the last meeting of the Board of Trustees, in accordance with the suggestion of the President, a committee was appointed to consider the expediency of a course of Law Lectures. After a full discussion the committee resolved to have such a course. Consequently, Gen. W. E. Doster was invited to lecture on "Practice in Pennsylvania," and Robt. E. Wright, Sr., Esq., on "The Law of Contracts." It was arranged that Dr. Coppée should deliver, as usual, his lectures on "International" and "Constitutional Law." Circulars were issued under the direction of the committee. The lectures began on the 3d of October, 1878. Twenty-four law-students from Easton, Allentown and Bethlehem matriculated, and these, with the members of the Senior Class, and persons casually attending, made it necessary to use the University Chapel. A "Moot Court" was organized, and held by the Hon. Henry Green and afterwards by Matthew Hale Jones, Esq., Gen. Doster, the Hon. Edward L. Dana and the President. The Hon. Ulysses Mercur, of the Supreme Court of Pennsylvania, presided on the 13th of February, when, in consequence of the resignation of Gen. Doster, the course was closed. The enterprise has been unexpectedly successful.

THE UNIVERSITY LIBRARY.

The Library Building was erected by the Founder of the University in 1877, at a cost of One Hundred Thousand Dollars, as a memorial of his daughter, Mrs. Lucy Packer Linderman, and during the

past year more than Twenty Thousand Dollars have been contributed by the family and friends of that estimable woman, as a memorial fund for the purchase of books.

The building is semi-circular in plan, with a handsome facade in the Venetian style of architecture. It is constructed of Potsdam sandstone with granite ornamentation. In the interior, the centre is occupied as a reading space, fifty by forty feet, from which radiate the book cases, extending from floor to ceiling; two galleries affording access to the upper cases. Shelf room is now provided for Eighty Thousand Volumes. The building is thoroughly fireproof, well lighted, and heated by steam.

During the past year ten thousand volumes have been placed upon the shelves, including many extremely valuable works. The list of periodicals numbers about fifty, embracing as far as possible all departments of knowledge.

The Library is conducted strictly for consultation, and is open to the use of the public; both of which conditions are in accord with the terms of the gift.

REGULATIONS OF THE LEHIGH UNIVERSITY LIBRARY.

I. The Library is open every day, except Sundays and Legal Holidays, from 8 A. M. until 9 P. M.

II. Admission is free to all persons over 16 years of age.

III. Readers are required to write their names and addresses in the Daily Register of the Library. They also write the name of the book desired upon a Library card, with their signatures, and present the same to the Director's Clerk, who supplies the book, retaining the card as a receipt. Before leaving the Library, readers return their books to the clerk and receive their cards.

IV. No book is permitted, under any circumstances, to be taken from the Library.

V. No person is allowed to enter the alcoves, or remove any book from the shelves, without the permission of the Director.

VI. Readers wishing to consult the more valuable illustrated works make special application for that purpose.

VII. In taking notes, pencils, and not pens and ink, are to be used.

VIII. Audible conversation and the use of tobacco are strictly forbidden in any part of the Library.

IX. Any person not conforming to these Regulations, will be denied the privileges of the Library.

X. Any person who defaces, in any way, any book, magazine or paper, or the furniture, or any portion of the building, in addition to being deprived of the privileges of the Library, will be prosecuted according to law.

OBSERVATORY.

By the liberality of Robert H. Sayre, Esq., one of the Trustees of the University, an Astronomical Observatory has been erected on the University grounds, and placed under the charge of the Professor of Mathematics and Astronomy.

In the dome of the observatory is mounted an Equatorial Telescope, of six inches aperture, by Alvan Clark & Sons. The west wing contains a superior Sidereal Clock, by Wm. Bond & Sons; a Zenith Telescope, by Blunt, and a Field Transit by Stackpole. There is also a Prismatic Sextant, by Pistor & Martins.

Students in practical Astronomy receive instruction in the use of the instruments and in actual observation.

The grounds upon which the observatory stands, consisting of seven acres of land adjoining the original grant, were presented to the University by Charles Brodhead, Esq., of Bethlehem.

An advanced course in Astronomy and the higher Analysis has been established, requiring two years for its completion.

It is adapted to the attainments of the graduates of this University, but is open to any one who may be prepared to pursue it.

This course embraces the following subjects:

First Year—Spherical Astronomy. Theory of Instruments. Method of Least Squares. Numerical Calculus.

Second Year—Celestial Mechanics. Interpolation and Quadrature. Computation of Orbits and Perturbations.

During the entire course, the student will have ample opportunity to familiarize himself with the practical work of the Observatory and Computing Room.

SOCIETIES.

THE CHEMICAL AND NATURAL HISTORY SOCIETY OF THE LEHIGH UNIVERSITY.

This Society was organized in the Fall of 1871, as "The Chemical Society," but was afterwards expanded, as its present title indicates, and admits, by election, students from all departments of the University.

The collections of Chemical Preparations, and Botanical and Zoölogical Specimens belonging to the Society, are already important. During the past years persons have been sent to Texas and Brazil to collect specimens for these cabinets.

The Society has organized and maintained several courses of public scientific lectures.

Among the honorary members of the Society are more than one hundred of the most distinguished scientists in Europe and the United States.

THE ENGINEERING SOCIETY.

This Society, established and organized in February, 1873, under the auspices of the Professor of Engineering, is designed especially for the benefit of students in Civil, Mechanical and Mining Engineering.

GRADUATING THESES.

Every student, in each of the Schools, will be required to present a thesis upon some topic connected with his special School, as a necessary portion of the exercises for his final examination for a diploma. These theses shall be accompanied by drawings and diagrams, when the subjects need such illustration. The originals will be kept by the University, as a part of the student's record, for future reference; but a copy may be retained by the student, and be published, permission being first obtained from the President.

UNIVERSITY DAY AND EXHIBITIONS.

The day following the close of the Annual Examination shall be known as University Day. Upon this day the "Annual Exhibition of Graduates" shall take place in the presence of the Trustees, Faculty and invited guests. The exercises shall consist of orations

and essays by members of the Senior Class. Every student must perform the duty assigned to him, unless excused by the President.

THESIS DAY.

On the day preceding University Day, the Theses will be publicly read by the graduating students.

The University Sermon will be preached on the Sunday before University Day, under the direction of the President.

RESIDENT GRADUATES.

Graduates who desire to pursue their studies under the direction of the Faculty, may be allowed the use of the Library, and may attend the lectures in any of the Departments. Although not bound by University hours, they will be required to obey the directions of the President and of the Professors in reference to their departments, and will have their names placed upon the Annual Register.

AWARD ON UNIVERSITY DAY.

The Wilbur Scholarship (value $200) was awarded, in 1878, to Murray M. Duncan, of the Sophomore Class. This Scholarship, founded in 1872, by E. P. Wilbur, Esq., of South Bethlehem, is awarded annually to that student of the Sophomore Class having the best record.

THE UNIVERSITY SERMON

Was preached by the Rev. John H. Hopkins, D.D., on Sunday, June 16th, in the University Chapel.

THE ADDRESS BEFORE THE ALUMNI

Was delivered by Mr. Eckley B. Coxe, on Wednesday evening, June 19th.

GRADUATING THESES OF THE CLASS OF 1878

Were read on Wednesday, June 19th, at 9½ o'clock A. M., as follows:

IN CIVIL ENGINEERING.

Review of the Bridge on the Lehigh & Susquehanna Railroad at Bethlehem, Pa.

James E. Gilbert.

On the Determination of Azimuths.

Milnor Paret.

Review of the 200 feet span of the Bridge in the D. & B. R. R, at Yardley, N. J.

William K. Randolph.

Review of the Gilbert Elevated Railroad, New York City.

Henry C. Wilson.

IN MECHANICAL ENGINEERING.

Review of the Pumping Engine of the Lehigh Zinc Company at Friedensville, Pa.

Charles Bull.

Review of the Method of Burning Anthracite Coal Dirt, invented by Mr. Jno. E. Wootten.

William S. Hazlett.

Review of the Engine on the Steam-tug "Bruce."

Nathaniel Lafon, Jr.

Review of Myers' Rotary Engine.

Benjamin B. Nostrand, Jr.

Review of the Compound Blowing Engine at the Bethlehem Iron Works.

H. F. J. Porter.

IN MINING ENGINEERING.

Description of the Methods of working up the Steel Scrap produced in the Bessemer Process.

Frank Perley Howe, A. B.

IN ANALYTICAL CHEMISTRY.

The Coplay Cement Stone, raw and burned.

Jno. W. Eckert.

Examination of the Impurities of the Water of the Lehigh River.

George W. D. Hope.

General Discussion of Fertilizers.

William P. Palmer.

The Composition and Theory of Reduction of a Metallic Residue from the Zinc Oxide Furnace, South Bethlehem, Pa.

William S. Winterstein.

The Utilization of certain waste products for the production of Ammonia and its substitutes for Fertilizers.

Byron Wittman.

IN GENERAL LITERATURE.

General Literature and Industrial Arts as Factors in Civilization.

Robert H. Read.

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" " " " " 1876-7 and Map.

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O Novo Testamento, traduzide em Portuguez.
Die Naturlehre. Eberhard.
Transactions of Moravian Historical Society. Parts 1, 2, 4 and 5.
" " " " 2d Series. Part 1.
Yellow Fever. W. A. Shubert.
Ninety-eighth General Meeting, Society United Brethren.
Reisebericht einer Mission unter den Mongolen.
Works of Rev. Claudius Buchanan.
Die Arithmetik, Geometrie und Trigonometrie. Kastner.
Geographischer Atlas. Berlin: 1760.

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Scientific American. Vols. I. to IX. inclusive.

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Report of the Secretary of War. 2d Session 44th Congress.
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Message and Documents, 2d Session, 45th Congress.
Walker's Statistical Atlas.
Report of Smithsonian Institution. 1877.

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Notices, etc., qui concerne le corps des Mines, Exposition Universelle a Paris. 1878.

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Pennsylvania Archives. Vol. VII.

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Powell's Report of Colorado River.

From Department of the Interior.

Bulletin United States Geological and Geographical Survey of the Territories. Vol. II. Part 4.
Natural Resources of the Black Hills. Jenney.
International Conference on Education. Philadelphia: 1876.
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Geological and Geographical Atlas of Colorado. 20 Plates.
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Atti della R. Accademia dei Lincei. 1876–78. Di Giovanni Eckio.

From Second Geological Survey of Pennsylvania.

Reports K^3, N^2, D^2, E, F, G, H^4 and O.

From Harvard College Observatory.

Annals Vol. IV. Part 2.
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From Argentine National Observatory.

Anales de la Oficina Meteorologica Argentina. Tome I.

From U. S. Coast Survey. J. E. Hilgard.

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American Ephemeris and Nautical Almanac. 1881.

From Diocese of Central Pennsylvania. R. A. Lamberton, Sec'y.

Journal of Proceedings. 1878.

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From Supt. Meteorological Office, Toronto, Canada.

Report of Meteorological Service. 1877.

From Commissioner of Patents.

Annual Report. 1877.
Patent Office Reports for year

The American Swedenborg Printing and Publishing Society, New York.

The Works of Swedenborg. 20 Vols.

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Annual Report Geographical Survey, West 100th Meridian, Lieut. G. M. Wheeler, for 1872. Vols. 4, 6 and 7.
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Vertebrata, Eocene. New Mexico. 1874.

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Coast Survey, Annual Reports. 1849-50-51.

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" Legislative Documents. Vol. VI. 2 Copies.

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Smithsonian Report. 1853.

Theory and Calculations of Continuous Bridges. Merriman.

Pennsylvania School Journal. 4 Vols., incomplete.

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From David A. Williams, Prop'r.

"Iron Age," for year.

From James M. Swank, Sec'y.

Bulletin American Iron and Steel Association.

Statistics of American and Foreign Iron Trades to January, 1878.

From Rev. C. Whitehead.

Journals of the Diocese of Pennsylvania. 1860 to 1869 inclusive, 1871 to 1873. 1875 and 1877.

Daily Churchman. October 5 to 28, 1871. October 9 to 15--23 to Nov. 4, 1874.

American Church Review. 1875-6.

London Quarterly Review. May, 1843.

American Quarterly Church Review. April, 1868.

International Review. July and August, 1874.

Church Missionary Intelligencer. May to August, 1872.

Map of the Diocese of Central Pennsylvania.

Proceedings Board of Mission P. E. Church. 1872. 1875.

Catalogue Divinity School, West Philadelphia. 1873-4. 1874-5-6-7.

Stevens Institute. 1871.

Reports Advancement So. Penna. 1875-6-7-8.

West Philadelphia Divinity School. Constitution and By-Laws.

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Cornell University. 1873-4.

Corporation Relief Widows and Children of Clergymen. 2 Pamphlets. 1851. 1870.

Chemical Society, Lehigh University. Address. 1872.

New Constitution of Pennsylvania. 1873.

University of the South. Proceedings. 1872-3-5-6-7.

Episcopacy. Fact and Law.

Inauguration President Union College. 1871.

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Cambridge Theological School. Catalogue. 1873, 1876.
A Plea for the Insane. 1873.
Three Sermons by Rev. Dr. Percival. 1875.
Sermon by Rev. Mr. Kimber. 1872.
" " Rev. Dr. Crummell. 1875.
Bishop Paddock's Charge. 1876.
Report to the Convention of the Diocese of Pennsylvania upon the Hymnal. 1874.
Pastoral Letter. 1877. House of Bishops, P. E. Church.
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By-Laws of Corporation for Relief of Widows of Clergymen.
Organization of Parish Association.
New Jersey Commission, Encouragement of Manufactures. 1878.

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Francis S. Holmes. Phosphate Rocks of South Carolina. Charleston. 1870. 8vo.

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From Mrs. R. A. Packer.

Specimen of Manna.

From Capt. Eudy, Friedensville.

Specimens of Blende and Greenockite.

From Jenkin T. Reese.

26 Fine Carboniferous Fossils.

From T. M. Eynon.

Crystallized Copper from Lake Superior.

From Prof. J. P. Kimball.

Malachite from Zanzibar, Africa.

From Charles Graham, Esq., Del., Lack. & W. R. R.

Boiler Incrustation.

From E. P. Wilbur.

Vase of Majolica Ware.
Pitcher. Haviland.
Crown-Derby Cup and Saucer.
Copeland Cup and Saucer.

From Mrs. Wm. H. Winston, West Point, Ga.

Specimens of Corundum and Asbestos.

TO THE MINERALOGICAL CABINET.

From Prof. W. H. Chandler.

Quartz Crystals.
Aragonite in Calamine.
Blende.
Chrysatile.

From Prof. W. T. Rœpper.

Quartz Crystal.

From Prof. F. Prime, Jr., Easton.

Quartz Crystal.

From Mrs. Ann H. Winston, West Point, Ga.

Corundum.

From C. B. Kneadles, New York.

Quartz Crystal.

From N. B. Wittman, Lanark.

Limonite.

TO THE DEPARTMENT OF MINING.

From E. H. Williams, E.M., Wilkesbarre.

Improved forms of Miners' Lamps for burning petroleum.

TO THE UNIVERSITY MUSEUM.

From Thomas W. Frederick, M.E., Catasauqua, Pa.

Brazilian Curiosities, including Blowgun, Quiver and Arrows, 6 Boar Spears, 1 Hunting Spear, Feather Crown, Pipe, Indian Comb, Cuia, Palm Fibre Rope, Necklace, Tonca Beans, Vanilla Beans, Ivory Palm Nut, Urucu, Brazil Nuts, Beetles' Wings, and a Toucan Skin.

From George A. Yohe.

40 specimens of natural and manufactured products of Brazil.

From W. M. Gummere.

Box of Insects.

From Alvah E. Chamberlain, Towanda.

Summer Duck, in Case.

TO THE CHEMICAL AND NATURAL HISTORY SOCIETY.

From Francis Weiss.

In aid of the Werner Collection, $100.

TO THE DEPARTMENT OF CIVIL AND MECHANICAL ENGINEERS.

From Kellogg & Maurice, Athens.

Iron Bridge Model, 10 feet long, 2½ feet high, 2½ feet wide, illustrating the double track through bridges built by Kellogg & Maurice, Athens, Pa.

TO THE GEOLOGICAL DEPARTMENT.

From Dr. and Mrs. Pinckney and Dr. Francis S. Holmes, Charleston, S. C.

A suite of Tertiary Vertebrate Remains and Fossils, and specimens from the phosphate beds of South Carolina.

From Prof. W. H. Chandler.

Numerous Fossils and Geological specimens.

From Prof. J. P. Kimball.

A suite of Ores and associated rocks from the Chateaugay magnetic iron ore mines, Clinton Co., N.Y.

A suite of Ores and Furnace Products from the neighborhood of Pittsford and Brandon, Vt.

A suite of specimens from the Clinton fossil ore seam, Tussey Mt., Black Valley, Bedford Co., Pa.

Miscellaneous specimens of Ores, Rocks and Minerals.

STUDENTS.

C. E.—Civil Engineering.
E. M.—Mining Engineer.
Metallt.—Metallurgist.
M. E.—Mechanical Engineering.
A. C.—Analytical Chemistry.
G. L.—General Literature.

SENIOR CLASS.

Name.	School.	Address.	Univ. Residence.
Jas. S. Cunningham,	M.E.,	Allentown,	Allentown.
Joseph H. Paddock,	M.E.,	Philadelphia,	13 Saucon Hall.
F. W. Sargent,	C.E.,	Wollaston, Mass.,	30 Saucon H.
Chas. W. Schmich,	A.C. (Special)	S. Bethlehem,	Fount'n Hill.
Harry J. Seaman,	A.C. (Special)	Bethlehem,	Market St.
Rich'd H. Tucker, Jr.,	C.E.,	Wiscasset, Me.,	24 Saucon Hall.
Lawrence Van Wyck,	E.M. (Special)	New York,	Saucon Hall.

JUNIOR CLASS.

NAME.	SCHOOL.	ADDRESS.	UNIV. RESIDENCE.
Wm. H. Bradbury,	A.C.,	Philadelphia,	23 Saucon H.
Irvin Brooke,	C.E.,	Limerick Station,	Market St.
Abram Bruner,	E.M.,	Philadelphia,	Fourth St.
Murray M. Duncan,	E.M.&A.C.,	Washington,D.C.	Cherokee St.
Thos. H. Hardcastle,	G.L.,	Easton,Md.,	Cherokee St.
John T. Jeter,	E.M.,	South Bethlehem,	Fount'n Hill.
Charles F. King,	A.C.,	Movers, N.Y.,	Birch St.
George E. Potter,	C.E.,	Ashland, Ohio,	Birch St.
Fred. P. Spalding,	C.E.,	Towanda, Pa.,	29 Saucon H.
Frederick C. Wootten,	M.E.,	Reading, Pa.,	14 Saucon H.

SOPHOMORE CLASS.

Name.	School.	Address.	Univ. Residence.
John T. Bourke,	M.E.,	Youngstown, O.,	80 Brodhead A.
Jas. T. Broughal,	C.E.,	South Bethlehem,	4th & Pine Sts.
William Butler,	C.E. (Special)	Chester Co., Pa.,	3d & New Sts.
Patrick A. Crilly,	G.L.,	Allentown,	Allentown.
Thos. W. Eynon, Jr.,	M.E.,	South Bethlehem,	Pine St.
B. Frank Haldeman,	E.M.,	Altoona, Pa.,	19 Saucon H.
William J. C. Loos,	G.L.,	Bethlehem,	21 Broad St.
Furman S. Phillips,	G.L.,	Philadelphia,	80 Brodhead A.
Lewis Stockton,	G.L.,	Phœnixville,	21 Saucon H.
Harry B. Strong,	Metallt.,	Cleveland, O.,	33 Saucon H.
L. B. Treharn,	G.L.,	Mauch Chunk,	28 Saucon H.
Russell B. Vankirk,	M.E.,	Bethlehem,	Church St.
Rich'd B. Wetherill,	G.L. (Special)	La Fayette, Ind.,	Fount'n Hill.
John Zimmele,	C.E.,	Bethlehem,	130 Market St.

FRESHMAN CLASS.

NAME.	ADDRESS.	UNIV. RESIDENCE.
Charles W. Abbott,	Bethlehem,	Church & Main.
Robert Arrowsmith,	Brooklyn, L. I.,	Saucon Hall.
Bernard Byrnes,	Reading,	
Willis G. Caffrey,	Bethlehem,	New St.
Wm. S. Darlington,	Delaware Co., Pa.,	New St.
Cornelius DeWitt,	Fort Monroe, Va.,	New St.
A. L. Dickinson,	E. Haddam, Conn.,	New St.
Robt. Orme Dobbins,	Baden, Ontario,	62 Market St.
James S. Dodson,	Wheeling, W. Va.,	C. M. Dodson's.
Timothy Donohoe,	South Bethlehem,	Buttonwood St.
James J. Doran,	South Bethlehem,	Fifth St.
L. O. Emmerich,	New York City,	Fountain Hill.
Charles W. Gray,	New York City,	Saucon Hall.
Jeremiah T. Griffin,	South Bethlehem,	New St.
Edward M. Henry,	Pawtucket, R. I.,	Main St.
Frank A. Holland,	Youngstown, Ohio,	Main St.
Charles C. Hopkins,	Woodhull, N.Y.,	Main St.
Frank E. Jacobson,	Bethlehem,	9 Market St.
Preston A. Lambert,	South Bethlehem,	Mr. Ulrich's.
Elmer H. Lawall,	South Bethlehem,	Garrison St.
Edwin R. Leavitt,	Park,	Univ. Terrace.
Richard Henry Lee, Jr.,	Lewistown, Pa.,	Brodhead Ave.
John McCafferty,	Allentown,	Allentown.
James M. McMahon,	South Bethlehem,	Locust St.
Robert T. Morrow,	Oswego, N. Y.,	47 Market St.
Francis A. Price,	Somer's Point, N.J.,	Main St.
Jenkin T. Reese,	Hyde Park,	Wyandotte St.
Ludwig L. Reese,	Plymouth,	62 Market St.
Conrad Reno,	South Bethlehem,	Birch St.
Jesse W. Reno,	South Bethlehem,	Birch St.
E. Ricksecker,	Canal Dover, Ohio,	Church St.
John B. Ruff,	Philadelphia,	Brodhead Ave.
Samuel B. Sickler,	Tunkhannock,	62 Market St.
George C. Stout,	Bethlehem,	52 Market St.
Calvin A. Sweitzer,	West Bethlehem,	7 Broad St.

STUDENTS ATTENDING LAW LECTURES.

N. S. Bachman,	Easton.
George L. Baum,	Bethlehem.
Henry S. Cavanaugh,	Easton.
Luther M. Fine,	Easton.
Allen H. Frocht,	Allentown.
Will Fackenthall,	Easton.
Henry J. Grim,	Allentown.
Thomas F. Gross,	Allentown.
Morris Hoats,	Allentown.
Boudinot Keith,	Fountain Hill.
H. H. Leavitt,	Univ. Terrace.
Ellis R. Lichtenwallner,	Allentown.
W. Allen Lichtenwallner,	Allentown.
J. F. Losch,	Allentown.
J. L. Marsteller,	Allentown.
Alexander H. Miller,	Allentown.
Oscar Meyer,	New York City.
Edward K. Renniger,	Allentown.
Fred G. W. Runk,	Allentown.
Joshua R. Serfass,	Easton.
James L. Schaadt,	Allentown.
John D. Ulrich,	Allentown.
J. T. White,	Bethlehem.
J. Marshall Wright,	Allentown.